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SHARPS III CONFIGURATION MANAGEMENT GUIDELINES(U) NAVAL
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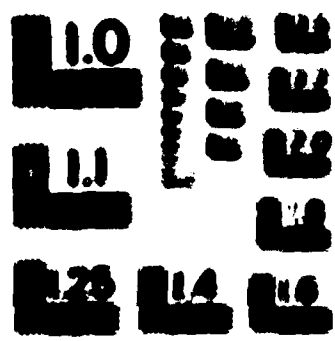
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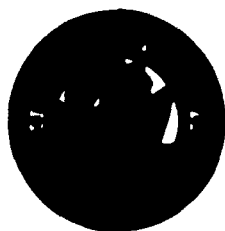
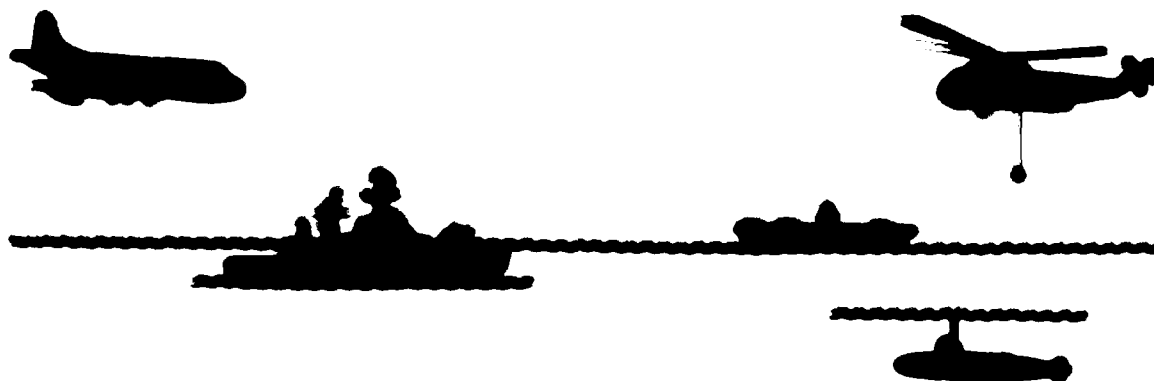
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Naval Air Station Environmental Acoustics Support Project

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NAFSA II Configuration Management Guidelines



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MR. G.L. Poffenberger

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ABSTRACT

↙ This report documents specific configuration management guidelines used when providing upgrades for the SHARPS III model in operation at Fleet Numerical Oceanography Center (FNOC). The benefits of maintaining strict configuration control over the SHARPS III model are discussed. Specific organizational responsibilities for the maintenance of various software components and the overall configuration management of the model are documented. The step-by-step procedure to be used in updating the model is also given. ↘

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1.0 BACKGROUND

Fleet Acoustic Sonography Center (FASC) provides an operational acoustic protection service to fleet users which is based on an acoustic protection software system that consists of numerous programs and software components. The SHOPS III model was developed for the FASC system under Naval Ocean Research and Development Activity (NORDA) Advanced Development (6-3) funding and NORDA maintains a continuing interest in ensuring the credibility of the SHOPS model in operation at FASC.

Since the SHOPS model is now part of the FASC system, development, maintenance and diagnostic efforts affecting the SHOPS model require close coordination between FLINTECHNICAL, NORDA, COMUSCIBCAN and NORDA contractors. Effective and timely communication is essential to the successful configuration management of a model when the maintenance of various software components involves shared responsibility. The purpose of the configuration management guidelines set forth in this publication is to document the responsibilities and procedures necessary for the successful configuration management of the SHOPS model.

These guidelines are consistent with enclosure (1) of a NORDA letter^{*} which outlined joint NORDA/FASC configuration management guidelines for acoustic protection system software.

^{*} NORDA Per COM-011 Ser 115/000 of 12 March 1982

2.0 CONFIGURATION MANAGEMENT FUNCTIONS

2.1 QUALITY CONTROL

Configuration management of the SHARPS model permits quality control of the model by ensuring that any permanent changes to the physics or software of the model undergo thorough test and evaluation (Section 5.0) and are approved by NORDA and coordinated with Commander, Naval Oceanography Command (CNOC) and FNOC well in advance of operational implementation.

2.2 UPDATE PROCEDURE

The SHARPS configuration management guidelines document the formal procedures (Section 5.0) to be followed when it becomes necessary to make changes to the model. Documentation of formal procedures not only reinforces quality control of the model, but also promotes an effective and timely progression from problem identification through model test and evaluation and operational implementation.

2.3 FNOC/NORDA CONSISTENCY

Configuration management provides for consistency between the FNOC (operational) and the NORDA (research and development) versions of the SHARPS model by ensuring that the source codes of the FNOC and NORDA versions differ only in locations of FNOC system dependent code (Section 4.1.3).

In general, the Fleet ASW communities view FNOC as the point of contact to which problems/complaints and requests for new products can be directed. NORDA assistance is usually solicited when such inquiries relate to the

SHARPS model. Inquiries of this nature require prompt action and a timely status report to all concerned parties. A more expeditious NORDA response is possible when consistency is maintained between the FNOC and NORDA versions of the model.

2.4 DOCUMENTATION

Section 4.0 of this report contains a description of the SHARPS documentation required by the NORDA configuration management program.

Thorough documentation of the SHARPS model is one of the most important steps in assuring the credibility of the model, and serves numerous functions including the following:

- description of model physics
- description of model software
- provides Fleet user with a description of the product
- provides R&D user with a thorough model description
- provides good starting point for problem analysis

3.0 ORGANIZATIONAL RESPONSIBILITIES

Figure (1) provides an overview of the organizational responsibilities involved in configuration management of the SHARPS model.

3.1 NAVAL OCEAN RESEARCH AND DEVELOPMENT ACTIVITY (NORDA)

NORDA provides funding for and maintains executive control over the configuration management of the SHARPS model. In addition, NORDA provides

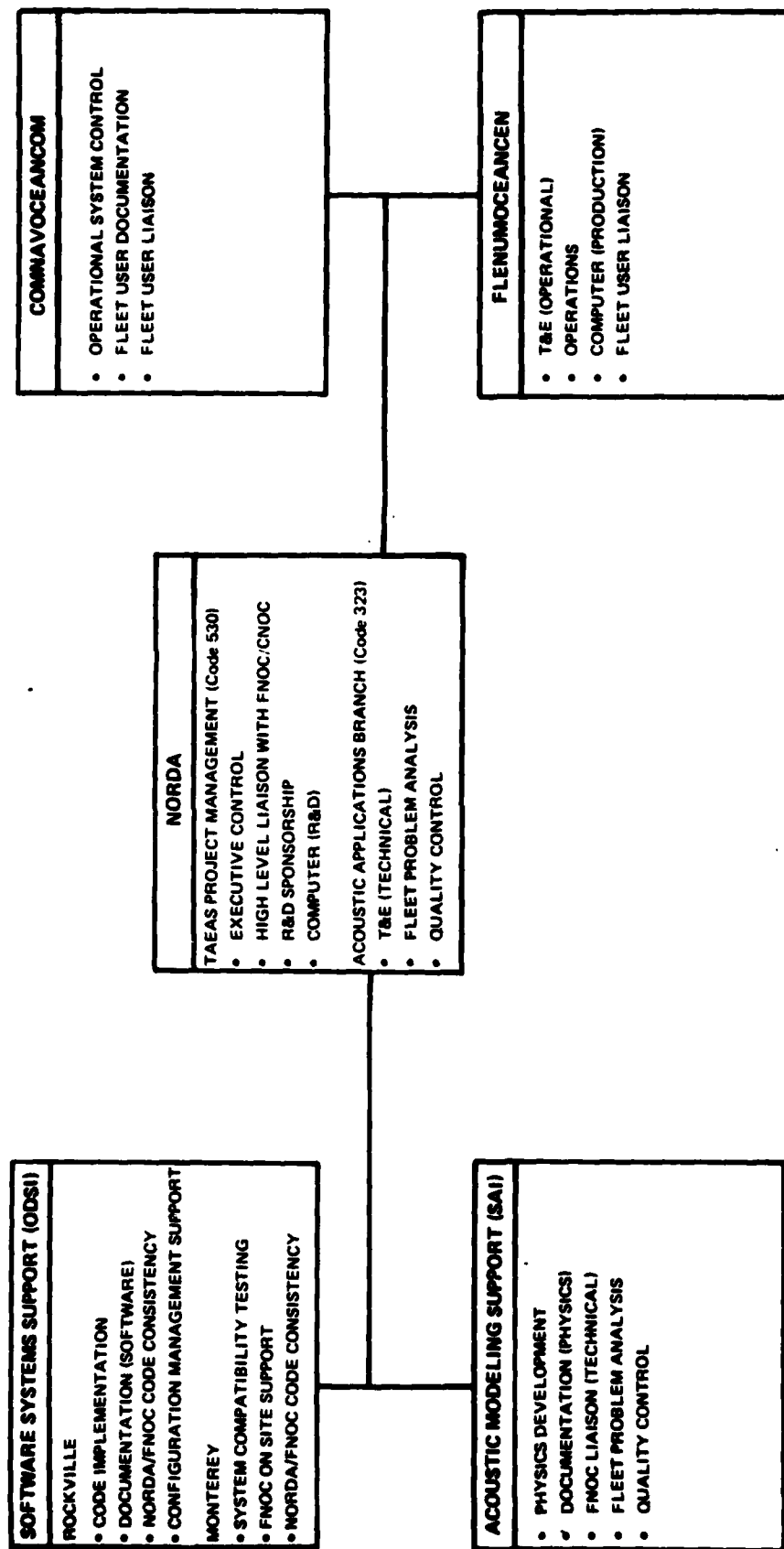


Figure 1. SHARPS Configuration Management Organizational Responsibilities

computer resources for research and development of the model. The NORDA configuration manager conducts high level liaison with ONR and PMRC, and serves as the focal point for research and development of the model. The NORDA technical analyst:

- o conducts technical liaison with the principal software analyst (ODSI) and the principal SWRPS developer (SAI)
- o directs test and evaluation of the model at NORDA
- o serves as technical adviser for the NORDA configuration manager

3.2 SOFTWARE SYSTEMS SUPPORT (OCEAN DATA SYSTEMS, INC.)

ODSI provides general configuration management support and technical advice concerning computer hardware and software to the NORDA configuration manager. The principal software analyst is responsible for code implementation and software documentation (Software Maintenance Manual and Update Reviews) of the model. In addition, the software analyst conducts liaison with the PMRC implementation coordinator (ODSI, Monterey) to assure that NORDA/PMRC model consistency is maintained. The PMRC implementation coordinator provides on site support to PMRC and coordinates emergency software modifications to the model.

3.3 ACOUSTIC MODELING SUPPORT (SCIENCE APPLICATIONS, INC.)

The principal SWRPS developer (SAI) is responsible for physics development, overall quality control, and physics documentation (Model Description and Update Reviews) of the model. In addition, the principal

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ORDER, NAVAL OCEANOGRAPHY COMMAND (CNOC)

[maintains, updates and prescribes standards for Fleet user
tion (COMNAVOCIANCOM Tactical Support Products Manual). CNOC
the introduction of the updated model to operational status after
that appropriate test and evaluation and update procedures have
been.

MENTATION

IPS MODEL DESCRIPTION

1 document will contain a description of the physics used in the
2 how it is implemented in the software code, the numerical
3 used in the model and the limits on accuracy.

IPS SOFTWARE MAINTENANCE MANUAL

1 document will contain a description of the code and how it relates
2, subprogram interfaces and common blocks.

ANNUAL UPDATE REVIEW

Update Review will describe in detail each update submitted for
use at CNOC. It will contain:

- an account of how the requirement for each update becomes known.
- a discussion of the shortcomings in the physics and/or the coding of the programs that created the problem.

- o a technical description of modifications to the physics and/or coding employed to correct the problem.
- o sample runs demonstrating the effects of each update.

Enclosure (1) of a NORDA letter^{*} was the initial documentation package describing the April 1982 operational SHARPS III update.

4.4 COMNAVCEANCOM TACTICAL SUPPORT PRODUCTS MANUAL

This document is a concise reference manual on the basic geophysical aspects of the ocean environment and a description of products available from CNOC commands which aid in the tactical use of environmental information. Volume I of the manual contains background information, and Volume II describes NAVCEANCOM standard tactical support products and their applications.

When changes to the SHARPS model affect the SHARPS input parameters, the appearance of the model output or the performance of the model under certain environmental conditions, changes are submitted to CNOC for approval and inclusion in their semiannual change to the Tactical Support Products Manual. This is necessary to maintain user awareness, and promote effective use of model outputs.

5.0 SHARPS UPDATE PROCEDURE

A flow diagram of the SHARPS update procedure is shown in Figure (2).

^{*} NORDA ltr CMC:bc Ser 115/080 of 5 April 1982

5.1 INITIALIZATION

Steps 5.1.1 through 5.1.3 below were performed initially to establish the NORBA SHARPS Program Library (PL) and can be repeated in the event that another PL is to be constructed from the operational PL at FNDC. It should not be necessary to generate another NORBA PL unless a discrepancy between the NORBA and FNDC PL listings is noted in step 5.11.3 below.

5.1.1 The most recent version of the FNDC SHARPS operational code will be transferred to NORBA and the (PL) will be catalogued as SHARPS/FNDCPL. The cycle number assigned at the time the file is catalogued becomes the baseline program cycle number for this particular version of the model.

5.1.2 FNDC system dependent code will be identified and its location within the PL documented (e.g., subroutine name, update IDENT, and sequence number).

5.1.3 The FNDC PL will be modified, to as little extent as possible, so that the resultant code will be executable on the NORBA computer. The following rules are to be followed when performing this task:

- o Calls of FNDC system dependent routines are not to be deleted. Instead, routines (dummies if necessary) are to be added to the code to replace the system routines.
- o If one or more consecutive lines of system dependent code are to be deleted, the same number of replacement COMMENT cards

should be inserted in place of the deleted code. These COMMENT cards should state that system dependent code has been replaced.

- If system dependent code is to be replaced by other code, comments to this effect must precede the new code.

The update IDENT for the set of system dependent updates will be NORDA. This will permit a programmer to scan the code for a particular routine or set of routines and easily identify the NORDA only code. The resultant PL will be catalogued as SHARPSNORDAPL and the corresponding binary file of executable code (LGO) as SHARPSNORDALGO. The cycle number will be the same as that used for SHARPSFNOCPL.

- 5.1.4 The model will then be executed at NORDA and at FNOC using duplicate input data sets, and output from the NORDA version will be compared to output from the FNOC operational version. If any inconsistencies are found, they will be resolved before continuing.

5.2 UPDATE INITIATION

- 5.2.1 Each proposed SHARPS update set not directly prepared by the principal software analyst is to be delivered to him via an appropriate medium (e.g., tape, disk file, cards, listing) as the first step in the SHARPS update cycle.

5.2.2 The update set will be assigned a SHARPS update number (SUN) consisting of three decimal digits followed by the letter A (e.g., 013A). The first update set will be 001A and each subsequent new update set will have a SUN that increases by one (i.e., 002A, 003A, etc.). However, if modification is made to an existing update set, the resultant update set will be assigned a SUN whose alphabetic element is the next unused letter in the alphabet. For example, if update set 002A is modified for the first time, the resultant update set will have a SUN of 002B. Then, if either 002A or 002B is subsequently modified, the new update set will be 002C. Thus, each update set will have a unique SUN that will be associated with that update set forever.

5.2.3 The software analyst will initiate a SHARPS update checklist (Figure 3). Upon completion of a task, appropriate personnel (e.g., SHARPS developer, NORDA technical analyst) will enter:

- cognizant organization for task completion
- task description
- date task completed
- their initials
- comments, as necessary

on the Update Checklist.

SHARPS UPDATE CHECK LIST

Update No. _____ Brief Description: _____

TASK NO.	RESP. ORG.	DESCRIPTION	DATE COMPLETED	INITIALS	COMMENTS
1	ODSI	Receive/prepare updates			
2	ODSI	Catalogue updates			
.					
.					
5	ODSI	Forward listings & output to SAI			
6	SAI	Analyze updates/data			
7	SAI	Forward recommendations to ODSI			
8	ODSI				
.					
.					
.					
.					
.					
19	FNOC	FNOC T&E			

Figure 3. SHARPS Update Check List (Sample Form)

5.2.4 The update set will be catalogued as a card image file with the permanent file name SHARPSUPDATEnnn1, where nnn1 is the SUN and the cycle number equals the cycle number of the version of SHARPS for which the updates were developed. (Note that while an update set may be developed for a particular SHARPS cycle, it may, in fact, be applied to a later cycle).

5.2.5 The software analyst will inspect the update set, making changes where necessary to ensure that the code:

- is in agreement with SHARPS programming standards and FNOC update standards,
- does what it is supposed to do,
- is as efficient as possible while meeting the two above constraints.

5.2.6 If any changes are made, a new SUN will be assigned to the resultant update set. This SUN will consist of the three digits of the original SUN plus the letter in the alphabet after the letter in the old SUN (e.g., if the old SUN was 015D, the new one will be 015E).

5.3 UPDATE TESTING

5.3.1 The software analyst will apply the update set to the current SHARPSHORDAPL (which corresponds to the current FNOC operational SHARPS PL and will create a test executable object code (L00). This executable code will be catalogued with the permanent file

name of SHIPSTESTmodL20. The SN will be the same as that of the update set, and the cycle number corresponds to the cycle number of the SHIPSTESTPL from which the test L20 was created. This procedure allows a particular test SHIPPS executable permanent file to be identified as to what the update set consisted of and what source code was updated. It is convenient to reference a particular version by the baseline program cycle and the update number (SN). For example, SHIPPS 16.2A refers to the executable permanent file SHIPSTESTmodL20, which was created by applying the update set, SHIPPSUPDATE20A, to the baseline SHIPPS program, SHIPSTESTPL, cycle number 16. Figure 4 is an illustration of the SHIPPS file structure associated with updating SHIPPS version 16 to SHIPPS version 17, and the first updates to version 17.

In creating this test file, the FULL update option will be used instead of a partial update followed by a CBPL. This will accomplish two things. First, it will ensure that the latest operating system modifications are included in the code. Second, if the test code undergoes successful I&E and subsequently becomes the CBPL operational SHIPPS code, it will guarantee that the test code and the operational code are exactly the same.

It is not presently anticipated that a PL corresponding to the test L20 file will have to be cataloged. However, if it is necessary to do so, the test PL will be cataloged with the same

permanent file name and cycle number as the test LGO except that the letters LGO will be replaced by the letters PL.

5.3.2 The test LGO will be executed using the FACTIVE and other data sets, as appropriate, as input.

5.4 QUALITY CONTROL

5.4.1 The software analyst will inspect the outputs, make changes to the update set as necessary, and repeat steps 5.2.5 through 5.4.1 until the outputs appear satisfactory.

If the update set does not include any physics, mathematics, or modeling changes, then steps 5.4.2 through 5.4.4 may be omitted.

5.4.2 A listing of the updates, the updated routines, and all test output will be transmitted to the principal SHARPS developer.

5.4.3 The principal developer, will inspect the updates and outputs and will either approve them or provide the software analyst with a list of recommended changes.

5.4.4 The software analyst will implement any suggested changes and steps 5.2.5 through 5.4.4 will be repeated until both the developer and software analyst are satisfied.

5.5 NORDA T&E

5.5.1 The NORDA configuration manager will be notified that the developer and the software analyst both approve the current update set. The current SUN, listings of the updates and

updated routines and test outputs will be provided to the NORDA configuration manager (or the NORDA technical analyst) for T&E at NORDA.

5.5.2 The NORDA technical analyst will perform T&E on the update set and will either inform the NORDA configuration manager that he approves the update set or he will provide feedback to the software analyst and principal developer and advise the NORDA configuration manager as to the problems encountered.

5.5.3 The software analyst will implement modifications to the update set as requested by the NORDA configuration manager (as a result of NORDA T&E). Steps 5.2.5 through 5.5.3 will be repeated until the NORDA configuration manager approves the update set.

The procedure in steps 5.2.1 through 5.5.3 will be performed for each update set.

5.6 COMBINING UPDATE SETS

Update sets which undergo successful T&E and are approved by the NORDA configuration manager in step 5.5.3 above will be combined into a single update set in preparation for the semiannual transmission of the update set to FNOC for operational T&E. Accordingly, steps 5.6.1 and 5.6.2 will be performed semiannually.

5.6.1 The software analyst will combine the update sets into a single set, resolving update conflicts and making any other changes as are necessary. A new SUN will be assigned to the resultant update set.

5.6.2 Steps 5.3.1 through 5.5.3 are then repeated until the NORDA configuration manager approves the combined update set.

5.7 SOFTWARE DOCUMENTATION (SHARPS UPDATE REVIEW)

5.7.1 The software analyst (or NORDA Numerical Modeling Acoustic Applications Branch) will prepare a semiannual SHARPS Update Review according to the specifications in Section 4.3 above.

5.7.2 The SHARPS Update Review will be transmitted to the principal SHARPS developer and the NORDA technical analyst. (The software analyst will also receive a copy if he was not involved in the preparation of the document.)

5.7.3 The principal developer and the technical analyst (and the software analyst when applicable) will review the document and will either approve it or forward a list of recommended changes to the preparer of the document.

5.7.4 The document preparer will incorporate the changes and steps 5.7.2 and 5.7.3 will be repeated until the SHARPS developer, the technical analyst and the software analyst are all satisfied.

5.7.5 The NORDA configuration manager will be notified that the SHARPS developer, the NORDA technical analyst and the SHARPS software analyst approve the Update Review.

5.7.6 The NCRBA configuration manager will review the document and forward it to FROC where it will be available for use as a reference manual during operational implementation and I&E of FROC.

5.8 USER DOCUMENTATION (ONE TACTICAL SUPPORT PRODUCTS MANUAL)

If the updates that will be transmitted to FROC in step 5.8.1 below contain only model changes that will be transparent to the user, then steps 5.8.1 through 5.8.3 will be omitted.

5.8.1 Changes to the Tactical Support Products Manual for which NCRBA has lead responsibility will be prepared in accordance with ONK standards and submitted to the NCRBA configuration manager for approval.

5.8.2 The NCRBA configuration manager will forward the changes to FROC/CNOC.

5.8.3 CNOC then reviews:

- o proposed changes to the manual
- o results of FROC I&E (Section 5.9 below)

and either approves or modifies the material for inclusion in the semiannual change to the Tactical Support Products Manual.

5.9 FROC I&E

5.9.1 After the NCRBA configuration manager approves the update set, it will be transmitted by the software analyst to the FROC

Implementation coordinator via the appropriate medium (e.g., logs, disk files, cards). (At the same time, system software documentation and user documentation will be updated to FREQ and CHGE.)

The FREQ implementation coordinator will apply these updates to the current FREQ MASTERPI, and create a test LUB.

The new LUB will then undergo system compatibility testing and operational use as FREQ. If during the use it is found necessary to modify the update set, the FREQ implementation coordinator will inform the software analyst as to the nature and volume of the changes.

- (a) If the changes only involve FREQ system dependencies, the software analyst and the implementation coordinator can agree to make the necessary changes to the FREQ and NORDA update sets and create new corresponding LUB files; the FREQ FAE will then continue.
- (b) If the updates require any other type of modification, the NORDA configuration manager is to be informed of the nature and consequences of the changes. He may decide to follow the same procedure as was followed in (a) above (i.e., make the changes at FREQ and NORDA and continue the FAE), or he may require that steps 4.3.1 through 4.6.3 be repeated until no changes need be made to the FREQ updates.

In either case, if any change at all are made to the update set delivered to FNOC, a new version letter will be assigned to the modified update set which will then be catalogued at NORDA along with the corresponding test L&O file.

5.9.4 Upon completion of the FNOC T&E, FNOC will notify CNOC and the NORDA configuration manager of the results.

5.9.5 The NORDA configuration manager will then decide if additional updates are necessary (and if so, what steps are to be taken), or if he approves the code as it stands.

5.9.6 The NORDA configuration manager will notify CNOC that he approves the update set.

5.9.7 CNOC ensures that appropriate configuration management procedures have been followed (and if so, approves the introduction of the new capability to operational status).

5.10 OPERATIONAL IMPLEMENTATION

After approval for operational implementation has been given by CNOC, the following steps will be performed.

5.10.1 The FNOC implementation coordinator will transfer the approved code to operational status and permanently update all SHARPS related PL's.

5.10.1 A DUMPF of all SHARPS related permanent files will be performed for archiving purposes.

5.10.3 The software analyst will catalogue a new operational SHARPS PL at NORBA (SHARPSNORBAPL) and the corresponding LGO (SHARPSNORBALGO) using the next sequential cycle number.

5.10.4 The NORBA configuration manager will be notified by the implementation coordinator and the software analyst as to the dates that the FNOC and NORBA versions, respectively, were made operational.

5.11 WRAP-UP

5.11.1 A complete listing of the NORBA operational PL with the latest updates will be forwarded to the NORBA technical analyst and the SHARPS developer with a copy being retained by the software analyst.

5.11.2 The FNOC implementation coordinator will forward a complete listing of the FNOC operational PL to the software analyst.

5.11.3 The software analyst will inspect the NORBA and FNOC operational PL listings, and will perform step 5.1.4 to ensure that FNOC/NORBA consistency has been maintained. If any inconsistencies are found, the software analyst will immediately notify the FNOC implementation coordinator and the NORBA configuration manager who will decide what steps are to be taken to resolve the inconsistency.

5.11.4 Within two weeks of the updates becoming operational at FNOC and NORBA, all SHARPS update checklists are to be transmitted to the software analyst who will retain a copy and forward the

original to the NORDA configuration manager. ODSI and NORDA will each maintain a SHARPS update log book containing the checklist from all organizations involved in the update procedures.

5.12 EMERGENCY PROCEDURE

Occasionally, a situation may arise that makes it impractical to follow the above procedure (e.g., program crash during a critical processing period, immediate Fleet request for a special format or special processing). When this is the case, all updating rules will be suspended and the FNOC implementation coordinator will directly apply whatever updates are necessary. However, at the earliest reasonable moment, the FNOC implementation coordinator will transmit the updates to the software analyst who will then recommend to the NORDA configuration manager what actions are to be taken concerning these updates (e.g., delete them from the FNOC code, put them through the formal SHARPS Update Procedure, add them to an existing update set that will shortly be evaluated, etc.).

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